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EXAMINER	
GUZMAN, APRIL S	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/782,097	NODA ET AL.	
	Examiner	Art Unit	
	April S. Guzman	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/19/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/07/2007 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 7-9, 11, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's admission of prior art** in view of **Heinonen (U.S. Patent # 5,896,562)**.

Consider **claim 1**, Applicant's admission of prior art teach a digital signal transceiver (read as conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (read as frequency modulator 61) for outputting a modulated signal in a transmitting mode (page 4 lines 3-6), and for outputting a non-modulated signal in a receiving mode (page 3 lines 22-27, and page 4 lines 1-2), said frequency modulator (modulator including a PLL) (page 3 lines 16-21) comprising;

a power amplifier for receiving the modulated signal output from the frequency modulator (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (Figure 5, and page 3 lines 6-7);

an antenna switch (Figure 5) comprising

a first branch port for receiving a signal output from the power amplifier (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to teach a variable frequency oscillator and a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal.

In the related art, Heinonen teaches a variable frequency oscillator (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) (Figure 3, column 5 lines 52-67) and

a first frequency divider unit that switches between a modulating frequency divider (read as divider 361) and a non-modulating frequency divider (read as divider 311), the non-modulating frequency divider receiving a signal output from the variable oscillator and

outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal (Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Heinonen into the teachings of Applicant's admission of prior art for the purpose of a transmitter/receiver for transmitting and receiving and RF signal in two operating frequency bands.

Consider **claim 2, as applied to claim 15**, Applicant's admission of prior art as modified by Heinonen further teach wherein the level of the phase nose in the modulated signal is larger than the level of the phase noise in the non-modulated signal (Applicant's admission of prior art - Figure 6, and page 6 lines 11-16).

Consider **claim 3, as applied to claim 1 above**, Applicant's admission of prior art as modified by Heinonen further teach wherein the signal output from the variable frequency oscillator has a frequency varying according to a signal input thereto (Heinonen - Figure 3, column 5 lines 36-67), and

wherein the frequency modulator further comprises

a reference signal generating unit (read as a signal formed by a reference oscillator 358) for generating a first reference signal (Heinonen - Figure 3, and column 5 lines 52-67),

a phase comparator (read as phase comparator 343) for comparing a signal output from the first frequency divider unit with the first reference signal in phase (Heinonen - Figure 3, and column 5 lines 52-67), and

a low-pass filter (read as low pass filter 345) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator (Heinonen - Figure 3, and column 5 lines 52-67).

Consider **claim 4, as applied to claim 3 above**, Applicant's admission of prior art as modified by Heinonen further teach wherein a frequency of the first reference signal in the transmitting mode is higher than a frequency of the first reference signal in the receiving mode (Applicant's admission of prior art - Figure 5, Figure 6, and page 6 lines 6-9).

Consider **claim 5, as applied to claim 3 above,** Applicant's admission of prior art as modified by Heinonen further teach a reference signal generator for generating a second reference signal (Heinonen - Figure 3, and column 5 lines 52-67), and

a second frequency divider unit for outputting the first reference signal by frequency-dividing the second signal by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode (Heinonen - Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28).

Consider **claim 7, as applied to claim 3 above,** Applicant's admission of prior art as modified by Heinonen teach a digital signal transceiver comprising a frequency modulator with a low pass filter.

However, Applicant's admission to prior art as modified by Heinonen fails to teach that the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

Nonetheless, the Examiner takes Official Notice of the fact that a cut off frequency in the transmitting mode is higher than a cut off frequency in the receiving mode of a low-pass filter in a transceiver is well known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a cut off frequency in the transmitting mode higher than a cut off frequency in the receiving mode as known in the art in the low pass filter taught by Heinonen for the purpose of incorporating a filter that passes low frequencies but attenuates frequencies higher than the cut off frequency.

Consider **claim 8**, Applicant's admission of prior art teaches a digital signal transceiver (read as conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (read as frequency modulator 61) for outputting a modulated signal in a transmitting mode (page 4 lines 3-6), and for outputting a non-modulated signal in a receiving mode (page 3 lines 22-27, and page 4 lines 1-2), said frequency modulator comprising;

a power amplifier for receiving a signal output from the frequency modulator (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (Figure 5, and page 3 lines 6-7);

an antenna switch (Figure 5) including

a first branch port for receiving a signal output from the power amplifier (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to teach a reference signal generating unit for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in the receiving mode, a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto, a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting a modulated signal, a phase comparator for comparing one of the modulated signal or the non-

modulated signal output from the first frequency divider unit with the first reference signal in phase, and a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator.

In the related art, Heinonen teaches a reference signal generating unit (read as a signal formed by a reference oscillator 358) for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in the receiving mode (Figure 3, and column 5 lines 52-67) ,

a variable-frequency oscillator (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) for outputting a signal having a frequency varying according to a signal input thereto (Figure 3, column 5 lines 52-67),

a first frequency divider unit that switches between a modulating frequency divider (read as divider 361) and a non-modulating frequency divider (read as divider 311), the non-modulating frequency divider receiving a signal output from the variable oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal (Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28),

a phase comparator (read as phase comparator 343) for comparing one of the modulated signal or the non-modulated signal output from the first frequency divider unit with the first reference signal in phase (Figure 3, and column 5 lines 52-67), and

a low-pass filter (read as low pass filter 345) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator (Figure 3, and column 5 lines 52-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Heinonen into the teachings of Applicant's admission of prior art for the purpose of a transmitter/receiver for transmitting and receiving and RF signal in two operating frequency bands.

Consider **claim 9, as applied to claim 8 above,** Applicant's admission of prior art as modified by Heinonen further teach a reference signal generator for generating a second reference signal (Heinonen - Figure 3, and column 5 lines 52-67), and

a second frequency divider unit for outputting the first reference signal by frequency-dividing the second signal by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode (Heinonen - Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28).

Consider **claim 11, as applied to claim 8 above**, Applicant's admission of prior art as modified by Heinonen teach a digital signal transceiver comprising a frequency modulator with a low pass filter.

However, Applicant's admission to prior art as modified by Heinonen fails to teach that the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

Nonetheless, the Examiner takes Official Notice of the fact that a cut off frequency in the transmitting mode is higher than a cut off frequency in the receiving mode of a low-pass filter in a transceiver is well known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a cut off frequency in the transmitting mode higher than a cut off frequency in the receiving mode as known in the art in the low pass filter taught by Heinonen for the purpose of incorporating a filter that passes low frequencies but attenuates frequencies higher than the cut off frequency.

Consider **claim 13, as applied to claim 12 above**, Applicant's admission of prior art as modified by Heinonen teach a digital signal transceiver comprising a frequency modulator with a low pass filter.

However, Applicant's admission to prior art as modified by Heinonen fails to teach that the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

Nonetheless, the Examiner takes Official Notice of the fact that a cut off frequency in the transmitting mode is higher than a cut off frequency in the receiving mode of a low-pass filter in a transceiver is well known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a cut off frequency in the transmitting mode higher than a cut off frequency in the receiving mode as known in the art in the low pass filter taught by Heinonen for the purpose of incorporating a filter that passes low frequencies but attenuates frequencies higher than the cut off frequency.

Consider **claim 14,** Applicant's admission of prior art teaches a digital signal transceiver (read as conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (read as frequency modulator 61) for outputting a modulated signal in a transmitting mode (page 4 lines 3-6), and for outputting a non-modulated signal in a receiving mode (page 3 lines 22-27, and page 4 lines 1-2), said frequency modulator comprising;

a power amplifier for receiving a signal output from the frequency modulator (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (Figure 5, and page 3 lines 6-7);

an antenna switch (Figure 5) including

a first branch port for receiving a signal output from the power amplifier (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to teach a reference signal generating unit for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in the receiving mode, a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto, a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting a modulated signal, a phase comparator for comparing one of the modulated signal or the non-modulated signal output from the first frequency divider unit with the first reference signal in phase, and a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator.

In the related art, Heinonen teaches a reference signal generating unit (read as a signal formed by a reference oscillator 358) for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in the receiving mode (Figure 3, and column 5 lines 52-67),

a variable-frequency oscillator (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) for

outputting a signal having a frequency varying according to a signal input thereto (Figure 3, column 5 lines 52-67),

a first frequency divider unit that switches between a modulating frequency divider (read as divider 361) and a non-modulating frequency divider (read as divider 311), the non-modulating frequency divider receiving a signal output from the variable oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal (Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28),

a phase comparator (read as phase comparator 343) for comparing one of the modulated signal or the non-modulated signal output from the first frequency divider unit with the first reference signal in phase (Figure 3, and column 5 lines 52-67), and

a low-pass filter (read as low pass filter 345) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator, the low-pass filter having a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode (Figure 3, and column 5 lines 52-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Heinonen into the teachings of Applicant's admission of prior art for the purpose of a transmitter/receiver for transmitting and receiving and RF signal in two operating frequency bands.

Consider **claim 15, as applied to claim 1 above**, Applicant's admission of prior art as modified by Heinonen further teach wherein a phase noise in the non-modulated signal has a level different from a level of a phase noise in the modulated signal (Applicant's admission of prior art - Figure 5, Figure 6, and page 6 lines 6-9).

Claims 6, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's admission of prior art** in view of **Heinonen (U.S. Patent # 5,896,562)** and further in view of **Castiglione et al. (U.S. Patent # 7,079,616)**.

Consider **claim 6, as applied to claim 3 above**, Applicant's admission of prior art as modified by Heinonen teach wherein the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) (Heinonen - Figure 3, column 5 lines 52-67).

However, Applicant's admission of prior art as modified by Heinonen fail to teach wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator.

In the related art, Castiglione et al. teach wherein the frequency modulator further comprises a charge pump (read as charge pump 16) for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode

and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator (Figure 1, column 3 lines 1-23 and column 4 lines 45-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Castiglione et al. into the teachings of Applicant's admission of prior art as modified by Heinonen for the purpose of supplying or extracting charge with respect to the filter via current pulses wherein a variable frequency signal is used to be generated for use in broadening the spectrum via a phase lock loop PLL.

Consider **claim 10, as applied to claim 8 above** , Applicant's admission of prior art as modified by Heinonen teach wherein the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) (Heinonen - Figure 3, column 5 lines 52-67).

However, Applicant's admission of prior art as modified by Heinonen fail to teach wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator.

In the related art, Castiglione et al. teach wherein the frequency modulator further comprises a charge pump (read as charge pump 16) for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode

and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator (Figure 1, column 3 lines 1-23 and column 4 lines 45-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Castiglione et al. into the teachings of Applicant's admission of prior art as modified by Heinonen for the purpose of supplying or extracting charge with respect to the filter via current pulses wherein a variable frequency signal is used to be generated for use in broadening the spectrum via a phase lock loop PLL.

Consider **claim 12**, Applicant's admission of prior art teaches a digital signal transceiver (read as conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (read as frequency modulator 61) for outputting a modulated signal in a transmitting mode (page 4 lines 3-6), and for outputting a non-modulated signal in a receiving mode (page 3 lines 22-27, and page 4 lines 1-2), said frequency modulator comprising;
a power amplifier for receiving a signal output from the frequency modulator (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (Figure 5, and page 3 lines 6-7);

an antenna switch (Figure 5) including

a first branch port for receiving a signal output from the power amplifier (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to teach a reference signal generating unit for generating a reference signal, a voltage-controlled oscillator for outputting one of the modulated signal or the non-modulated signal having a frequency varying according to a voltage input thereto, a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the voltage-controlled oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the voltage-controlled oscillator and a modulating signal and outputting the modulated signal, a phase comparator for comparing one of the modulated signal or the non-modulated signal output from the frequency

divider unit with the reference signal in phase, a charge pump for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator, and a low-pass filter receiving the first and second currents and outputting the signal input to the voltage-controlled oscillator.

In the related art, Heinonen teaches a reference signal generating unit (read as a signal formed by a reference oscillator 358) for generating a reference signal (Figure 3, and column 5 lines 52-67),

a voltage-controlled oscillator for outputting one of the modulated signal or the non-modulated signal having a frequency varying according to a voltage input thereto (read as voltage controlled oscillator VCO 341, wherein the output signal is amplified to form an output signal, the frequency of the signal is divided.) (Figure 3, column 5 lines 52-67),

a frequency divider unit that switches between a modulating frequency divider (read as divider 361) and a non-modulating frequency divider (read as divider 311), the non-modulating frequency divider receiving a signal output from the variable oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal (Figure 3, column 5 lines 36-51, column 5 lines 52-67, and column 6 lines 13-28),

a phase comparator (read as phase comparator 343) for comparing one of the modulated signal or the non-modulated signal output from the frequency divider unit with the reference signal in phase (Figure 3, and column 5 lines 52-67), and

a low-pass filter (read as low pass filter 345) receiving the first and second currents and outputting the signal input to the voltage-controlled oscillator (Figure 3, and column 5 lines 52-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Heinonen into the teachings of Applicant's admission of prior art for the purpose of a transmitter/receiver for transmitting and receiving and RF signal in two operating frequency bands.

However, Applicant's admission of prior art as modified by Heinonen fail to teach a charge pump for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator.

In the related art, Castiglione et al. teach a charge pump (read as charge pump 16) for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator (Figure 1, column 3 lines 1-23 and column 4 lines 45-47).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: see PTO-892 Notice of Reference Cited.

Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450

Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to April S. Guzman whose telephone number is 571-270-1101. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lana Le can be reached on 571-272-7891. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April S. Guzman
A.S.G/asg
08/14/07

8-17-07
LANA LE
PRIMARY EXAMINER